

T04D08 – HL Bonding Quiz

Name.....

1. What is the formula for an ionic compound formed between an element, X, from group 2 and an element, Y, from group 6?
- A. XY
B. X₂Y
C. XY₂
D. X₂Y₆

2. Which substance has the lowest electrical conductivity?
- A. Cu(s)
B. Hg(l)
C. H₂(g)
D. LiOH(aq)

3. How many lone pairs and bonding pairs of electrons surround xenon in the XeF₄ molecule?

	Lone pairs	Bonding pairs
A.	4	8
B.	0	8
C.	0	4
D.	2	4

4. What is the Lewis (electron dot) structure for sulfur dioxide?

- A. $\ddot{O} \cdot S \cdot \ddot{O} \cdot$
B. $\ddot{O} : \ddot{S} : \ddot{O} :$
C. $\ddot{O} : \ddot{S} : \ddot{O} :$
D. $\ddot{O} : \ddot{S} : \ddot{O} :$

5. What are responsible for the high electrical conductivity of metals?

- A. Delocalized positive ions
B. Delocalized valence electrons
C. Delocalized atoms
D. Delocalized negative ions

6. Which is a correct description of metallic bonding?

- A. Positively charged metal ions are attracted to negatively charged ions.
B. Negatively charged metal ions are attracted to positively charged metal ions.
C. Positively charged metal ions are attracted to delocalized electrons.
D. Negatively charged metal ions are attracted to delocalized electrons.

7. Which molecule is linear?

- A. SO₂
B. CO₂
C. H₂S
D. Cl₂O

8. In which substance is hydrogen bonding present?

- A. CH₄
B. CH₂F₂
C. CH₃CHO
D. CH₃OH

9. When the following bond types are listed in decreasing order of strength (strongest first), what is the correct order?

- A. covalent > hydrogen > van der Waals'
B. covalent > van der Waals' > hydrogen
C. hydrogen > covalent > van der Waals'
D. van der Waals' > hydrogen > covalent

10. Which substance is most similar in shape to NH₃?

- A. GaI₃
B. BF₃
C. FeCl₃
D. PBr₃

11. How many sigma (σ) and pi (π) bonds are present in the structure of HCN?

	σ	π
A.	1	3
B.	2	3
C.	2	2
D.	3	1

12. Which allotropes contain carbon atoms with sp^2 hybridization?

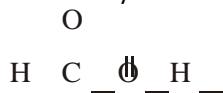
- I. Diamond
II. Graphite
III. C_{60} fullerene

- A. I and II only
B. I and III only
C. II and III only
D. I, II and III
13. Which substance is most soluble in water (in mol dm^{-3}) at 298 K?
- A. CH_3CH_3
B. CH_3OCH_3
C. $\text{CH}_3\text{CH}_2\text{OH}$
D. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

14. Which of the following contain a bond angle of 90° ?

- I. PCl_4^+
II. PCl_5
III. PCl_6^-

- A. I and II only
B. I and III only
C. II and III only
D. I, II and III
15. What is the number of sigma (σ) and pi (π) bonds and the hybridization of the carbon atom in



	Sigma	Pi	Hybridization
A.	4	1	sp^2
B.	4	1	sp^3
C.	3	2	sp^3
D.	3	1	sp^2

16. What is the best description of the carbon-oxygen bond lengths in CO_3^{2-} ?

- A. One short and two long bonds
B. One long and two short bonds
C. Three bonds of the same length
D. Three bonds of different lengths

17. For the following compounds



- (i) Draw a Lewis structure for each molecule in the gas phase.
(Show all non-bonding electron pairs.)

(3)

- (ii) State the shape of each molecule and predict the bond angles.

(6)

- (iii) Deduce whether or not each molecule is polar, giving a reason for your answer.

(3)

(Total 12 marks)

- 18.** Draw a Lewis structure of a water molecule, name the shape of the molecule and state and explain why the bond angle is less than the bond angle in a tetrahedral molecule such as methane.

(Total 4 marks)

19. (a) State the meaning of the term hybridization. State the type of hybridization shown by the nitrogen atoms in N_2 , N_2H_2 and N_2H_4 .

(4)

- (b) By referring to the N_2H_2 molecule describe how sigma (σ) and pi (π) bonds form and describe how single and double bonds differ.

(4)

(Total 8 marks)

20. State **two** physical properties associated with metals and explain them at the atomic level.

(Total 4 marks)